



V. Symposium of Young Researchers on Pharmaceutical Technology, Biotechnology and Regulatory Science

January 18-20 2023 - Szeged, Hungary

Schedule

Friday, 20th January – 9:00-13:30 CET

9:00-10:15 Session 7 – Chairs: Noemi Csaba, Szilvia Berkó

OP-23 – 9:00-9:15 **Andrea-Gabriela Crisan, Alina Porfire, Sonia Iurian, Tibor Casian, Lucia Rus, Ioan Tomuță**

The broadening horizons of pharmaceutical 3D printing – Simple strategies for complex formulations

OP-24 – 9:15-9:30 **Petra Party, Zsófia Ilona Pizsman, Rita Ambrus**

High-dose ibuprofen containing carrier-free dry powder inhalers for the therapy of cystic fibrosis

OP-25 – 9:30-9:45 **Josipa Martinović, Mirela Planinić, Ana Bucić-Kojić**

Bioaccessibility of phenolic compounds from grape pomace extracts

OP-26 – 9:45-10:00 **Martin Cseh, Gábor Katona, Ildikó Csóka**

Optimization of design and printing parameters of solid microneedle array produced by SLA printer

OP-27 – 10:00-10:15 **Azza Asim Khalid Mahmoud, Géza Regdon Jr., Katalin Kristó**

Determination of design space for direct pelletization using ProCepT granulator

10:15-10:30 Coffee break

10:30-11:45 Session 8 – Chairs: Mária Budai-Szűcs, Milena Sorrenti

OP-28 – 10:30-10:45 **Alharith A. A. Hassan, Katalin Kristó, Géza Regdon Jr., Viktória Varga, Tamás Sovány**

Preparation and optimization of hydrophobic ion pairing complex of lysozyme

OP-29 – 10:45-11:00 **Bence Sipos, Márk Benei, Ildikó Csóka, Gábor Katona**

Formulation of sustained release sodium alginate beads loaded with antidiabetic drug containing polymeric micelles



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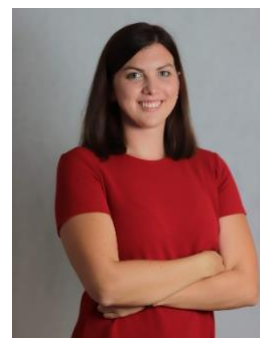
OP-24

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High-dose ibuprofen containing carrier-free dry powder inhalers for the therapy of cystic fibrosis

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Cystic fibrosis (CF) is characterized by inflammation, which contributes to lung damage. The nonsteroidal anti-inflammatory ibuprofen (IBU) significantly slows the progression of the illness. IBU should be taken in large doses, therefore inhalable particles could be beneficial to administer IBU directly to the lung.

We aimed to develop a carrier-free dry powder inhaler (DPI) system containing IBU. Inhalable powders were formed by wet milling and spray drying. We hypothesized a spherical shape, enhanced drug release, and optimal aerodynamic properties to provide a local treatment for CF.

The IBU was milled in a high-performance planetary mill. Solid particles were formulated from the microsuspension by spray-drying (Büchi Mini and Nano Spray-dryer). The following investigations were implemented: laser diffraction, scanning electron microscopy, density, solubility, X-ray powder diffraction, differential scanning calorimetry, dissolution test (Watchglass/PTFE disk assembly), and aerodynamic investigation (Andersen Cascade Impactor).

Wet milling led IBU to become micronized. The particle sizes of the spray-dried formulations were in the required pulmonary size range. The shape of the particles appeared spherical with hollows. The rheology measurement presented low density values. The structural analysis revealed that IBU becomes amorphous. The formulations demonstrated enhanced solubility and drug dissolution. The in vitro aerodynamic investigation showed proper lung deposition. We successfully formulated high-dose ibuprofen containing DPIs. We aimed to improve the water solubility by reducing particle size. The particle size, shape, and density properties resulted in an efficient in vitro aerodynamic behavior. The compositions could offer a novel therapy for CF.

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